E5.2e: Explain how the Hertzsprung-Russell (H-R) diagram can be used to deduce other parameters (distance).

Clarification: Brightness and color can be determined given the location of a star on the H-R diagram.

Holt Text: 781-786

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E5.2f: Explain how you can infer the temperature, life span, and mass of a star from its color. Use the H-R diagram to explain the life cycles of stars.

Clarification: The Hertzsprung-Russell diagram illustrates the relationship between the absolute magnitude and the surface temperature of stars. As stars evolve, their position on the Hertzsprung-Russell diagram moves. The temperature of a star is directly related to the color of a star.
Holt Text: 781-786

E5.2g: Explain how the balance between fusion and gravity controls the evolution of a star (equilibrium).

Clarification: none
Holt Text: 781-786

E5.2h: Compare the evolution paths of low, moderate and high mass stars using the H-R diagram.

Clarification: none
Holt Text: 781-786

Assignment

Draw Figure Three on page 783

Be sure to include

Title
Color
Labels
Explanation

Life Cycle of Stars Information Chart				
	Red Balloons	**Yellow Balloons**	**White Balloons**	**Blue Balloons**
Mass of Star → Age of Star ↓	0.4 Solar Mass (2/5 the mass of our Sun): Red stars	1 Solar Mass (the mass of our Sun): Yellow Stars	3 Solar Masses (3 times the mass of our Sun): White Stars	9 Solar Masses (9 times the mass of our Sun): Blue Stars
(start)	Blow up the star to about 3" diameter	Blow up the star to about 3" diameter	Blow up the star to about 3" diameter	Blow up the star to about 3" diameter
5 Million Years	Wait. Do not change diameter of balloon.	Wait. Do not change diameter of balloon.	Wait. Do not change diameter of balloon.	Blow slightly more air into balloon.
10 Million Years	Wait	Wait	Blow up a little more	Blow up star as fast and as much as you can. When star is fully inflated, teacher pops balloon--a supernova.
500 Million Years	Wait	Wait (note that planets are forming)	Continue to slowly inflate star. As it gets bigger, star cools, so color it yellow and red (make squiggles on surface with markers).	This popped star has become a black hole; all of the super nova remnants can be thrown out into space.
1 Billion Years	Wait	Blow up a little bit.	Quickly blow up star until fully inflated; pop balloon. Make sure to catch marble	Still black hole!
8 Billion Years	Wait.	Blow up more. The star is getting cooler, so color it red with marker. It is now a supergiant.	This star has exploded. Holding on to neutron star (marble), throw supernova remnants into space. Place remnants in a recycle bin to demonstrate stellar gas is recycled into new star matter.	Still black hole
10 Billion Years	Wait	Blow up a little more. Outer envelope dissolves, so cut up balloon. The inside bead becomes a white dwarf, and the bits of balloon represent the planetary nebula.	Neutron star	Still black hole
50 billion years	Blow up a little more	Move "planetary nebula" farther away. Place remnants in a recycle bin.	Neutron star	Still black hole
200 billion years	Deflate; star has shrunk and died. Color black. Wooden bead inside is a white dwarf.	Nebula is gone. Discuss that the white wooden bead turns black to show that it has burned out.	Neutron star	Still black hole